What is claimed is:

1. A hybrid artificial blood vessel comprising a biodegradable polymer-supporting layer on at least one of an inside and an outside of a non-degradable artificial blood vessel layer, wherein a drug is stored in at least one region selected from the group consisting of the microporous space of the non-degradable artificial blood vessel layer, the biodegradable polymer-supporting layer, and the interface of the artificial blood vessel layer and the supporting layer.

2. The hybrid artificial blood vessel as claimed in claim 1, wherein the biodegradable polymer comprises at least one polymer selected from the group consisting of synthetic polymers such as polyglicolide, polylactide, poly(lactic-co-glicolic acid) and polycaprolactone, or natural polymers such as chitosan, gelatin, alginic acid, hyaluronic acid and collagen.

3. The hybrid artificial blood vessel as claimed in claim 1, wherein the non-degradable artificial blood vessel layer comprises polyurethane derivatives, DacronR or drawn polytetrafluoroethylene.

5. The hybrid artificial blood vessel as claimed in claim 1, wherein the drug comprises at least one selected from the group consisting of vascular endothelial growth factor, fibroblast growth factor, nerve growth factor, platelet-derived growth factor, heparin, thrombin, laminin, fibronectin and collagen.

6. The hybrid artificial blood vessel as claimed in claim 1, wherein the biodegradable polymer-supporting layer is porous.

7. The hybrid artificial blood vessel as claimed in claim 1, wherein the biodegradable polymer-supporting layer is repetitively coated on the artificial blood vessel layer.

8. The hybrid artificial blood vessel as claimed in claim 1, wherein the surface of the non-degradable artificial blood vessel layer is modified physically or chemically.

9. A manufacturing process of a hybrid artificial blood vessel, comprising the steps of:

dissolving biodegradable polymer in organic solvent to prepare biodegradable polymer solution A;

adding porogen to the polymer solution A;

dissolving the same or different biodegradable polymer with the above biodegradable polymer in organic solvent to prepare biodegradable polymer solution B;

incorporating the biodegradable polymer solution B into micropores of an artificial blood vessel layer;

inserting tubes to the inside and outside of the artificial blood vessel layer;

filling the biodegradable polymer solution A in a space between the artificial blood vessel layer and the tubes;

drying the artificial blood vessel layer filled with

the biodegradable polymer solution A to remove the organic solvent; and

incubating the artificial blood vessel layer filled with the biodegradable polymer solution A in a water bath to remove the porogen.

10. The manufacturing process as claimed in claim 9, wherein the biodegradable polymer comprises at least one polymer selected from the group consisting of polyglicolide, polylactide, poly(lactic-co-glicolic acid), chitosan, gelatin, alginic acid and collagen.

11. The manufacturing process as claimed in claim 9, wherein the non-degradable artificial blood vessel layer comprises polyurethane derivatives, DacronR or drawn polytetrafluoroethylene.

12. The manufacturing process as claimed in claim 9, wherein the biodegradable polymer solutions A and B further comprise a drug which contains growth factors or

extracellular matrices.

13. The manufacturing process as claimed in claim 12, wherein the drug comprises at least a drug selected from the group consisting of vascular endothelial growth factor, fibroblast growth factor, nerve growth factor, platelet-derived growth factor, heparin, thrombin, laminin, fibronectin and collagen.

14. The manufacturing process as claimed in claim 9, wherein the surface of the non-degradable artificial blood vessel layer is modified physically or chemically.

15. An artificial organ for tissue engineering use prepared by any one of manufacturing processes of claims 9 and 14.